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An

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on

the effects of cold:

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By

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Effects of Gold.

Gold I maintain to be directly sedative, in its primary operations in every instance, & indirectly stimulant, when the application of it is not continued too long, & the system to which it is applied is capable of reaction. "Ubi stimulus vel irritatio ibi affluxus" is an aphorism of the Father of Medicine, the correctness of which has not, so far I know, been denied or disputed by any one, since his time, down to the present day. Hence I argue, that whatever causes a reflex, or reception of the blood, from the part or parts to which it may be applied, is not a stimulus. In order to argue more methodically & logically, I shall put my argument into the form of a Syllogism.

Whatever causes a reflex is not a stimulus.

Whatever causes action in a part, is a Stimulus
But Cold causes a reflex - or action different
from the preexisting
Therefore Cold is a Stimulant

But cold causes a reflux;

Therefore Cold is not a stimulus.

Thus I prove the major proposition. Every stimulus chemical, mechanical, or specific produces an afflux of blood to the part, to which it is applied. Heat, blisters, sinapisms &c all produce this effect. Therefore, whatever does not produce an afflux of blood to the part to which it is applied, is not a stimulus. Therefore, whatever produces an effect diametrically the opposite of afflux is not a stimulus. But reflux is diametrically the opposite of afflux: therefore whatever produces a reflux is not a stimulus. Thus I prove the minor proposition. Cold is so universally acknowledged to be a repellent, that it would be wholly superfluous to adduce any arguments in proof of it.

Surgeons have been, from time immemorial, in the habit of applying cold substances to inflamed parts; both to diminish the heat of the parts, & to cause a reflux, or reception of the blood from them. When a person goes into a cold bath, the surface becomes pale, & why? Because a reflux has taken place from the capillaries. Therefore Cold causes a reflux; & Large Cold is not a stimulus.

Cold in the language of Philosophy is but the absence of Heat, & why that, which instantaneously, & therefore primarily causes an absence, or diminution of what is acknowledged on all hands, as the natural & universal stimulus, should itself be called or considered a direct stimulus, I cannot conceive. Cold, by whatever medium it may be applied, whether

by water, or air, invariably produces a di-
minution of heat commensurate with its
degree: i.e. the greater the cold, the greater
the diminution of heat. When a hot &
cold substance are brought in contact, the
heat passes from the former to the latter
until the temperature of both is the same.
Thus hot & cold substances, when in con-
tact, ever tend to effect an equilibri-
um, or an equality of temperature. So it
is, when cold water, or air is applied to the
human body, the heat passes from the lat-
ter to the former, & continues so to pass, until
the heat, at the surface of the body, is
at length reduced to an equilibrium in
point of temperature with the air, or wa-
ter applied, which of course undergoes a
corresponding elevation. If A enter a
bath of 40° Fah. & B go into one of 50°

provided that the bodies of both be, at the time, of the natural standard 98° . & so to say will be reduced, at the surface, to 69° , & so to 74° . & having lost 29° & so 24° Fath. Now that which, when applied to the body, invariably takes away, ipso facto, a part of its stimulus, not secondarily & indirectly, but primarily & directly, ought not itself to be considered a direct stimulus; but cold, when applied to the human body, invariably takes away, by its primary & direct operation a part of its stimulus - & so cold ought not itself to be considered a direct stimulus. What then is cold if it be not a stimulus? Answer nothing that, in its primary operation, has a stronger claim to the appellation of sedative. & invariably diminishes, at the moment of its application, the natural stimulus of the



body; & causes a movement in the blood, diametrically the reverse of that produced by all known stimuli. Therefore, it must be something which, in its primary operation at least, is diametrically opposite to every known stimulus, & that is a sedative.

Another proof that cold is not a direct stimulus is, that it never produces inflammation per se. Baron Lancy tells us in his memoirs, that the soldiers in the French army, during the retreat from Moscow, experienced no ill effects from the most intense cold, though exposed to it many days, until a thaw supervened. Cold then requires the intervention of heat, before inflammation is produced by it. Heat itself, & all the stimuli with which we are acquainted produce inflammation per se, without the intervention of any other agent. Therefore cold differs, in this respect also,



from all known stimuli. It is not the proximate,
nor is it the occasional or exciting, it is merely
the predisposing cause of inflammation.

The effects produced by the medium, through
which cold is applied, are mistaken I believe
in many instances, for the effects of cold it-
self. If a bucket of cold water be thrown upon
a patient in syncope, it will operate as a sti-
mulus & resuscitate the patient. But cold, a
more negative quality, & simply the absence of
heat in the water, does not certainly, under
such circumstances, stimulate the patient.
No, it is the water itself, which, by the gravi-
ty of its globular particles produces a stimu-
lant impression on the nerves of the patient.
The atmospheric fluid will, also, when it
strikes the surface forcibly on a cold windy
morning, produce a stimulant impression on
the nervous system, independent of the seda-



the effect produced by the cold in it, or rather by the absence of heat in it.

But it will be perhaps asked, if I admit that the water itself, abstracting from its temperature, produces a stimulant impression, how I reconcile this with the sedative & sanative effects, which I shall now proceed to, as produced by cold water. Sympies & other physicians answer, that the stimulant impression of the water itself, when applied for a certain length of time is more than counterbalanced by the abstraction & loss of the stimulus heat, & eventually, a full & entire sedative effect is obtained, to the great relief & benefit of the patient.

Baron Larrey, who witnessed the effects of cold in various degrees, in different stages, & in different conditions, during the retreat of the French from Moscow, considers cold, if I understand him aright, as a direct sedative. "Cold," says the Baron in



his members, "not on the strong parts by blunting the sensibility of those organs, which are subjected to its immediate impression the natural Heat is absorbed, & a discharge & expropriation of caloric takes place the pores are closed: the fibres & capillary system fall into a state of contraction the fluids are condensed & flow more slowly. If first the action of the cold is painful, the skin wrinkles & loses its natural colour. Yet the animal heat & the vital powers resist this sedative & contracting power, that opposes the return of the fluids the capillary system is obstructed more easily, when its extreme ramifications are weakened. The skin becomes red, its sensibility is blunted, & if the effects of the cold continue, it gradually becomes extinguished & torpor soon takes place."

In the very interesting case of torpor from cold related by Dr. Ferriar in the 1st vol of the Edinburgh Medical & Surgical Journal, we find



some excellent remarks, by that gentleman, on the effects of cold, which he certainly seems to be a direct sedative. "Of the general exciting or stimulant power of heat" claims the "Dr." there can be no doubt. And with regard to cold, the disputes concerning its operation have been perpetuated by logical illusion only". Afterwards he proceeds thus - Within the limits of each appropriate range of temperature, the life & action vigour of the being is maintained. As the temperature descends, it stimulates less & less, till it reaches at length a point at which it ceases altogether to have any effect. On the other hand, the temperature carried too high for the power of the system, debilitates the individual, & destroys action, which may be again restored by reducing the temperature; & thus the abstraction of caloric invigorates & produces excitement. In this way, the stimulant power of heat, the sedative operation of cold.



What has been called its *active power* are two in
 fact, & mutually reconcilable. The energies of organised
 beings are not constant but fluent quantities,
 the kind & degree of heat, therefore which results
 from the operation of an external agent, will
 be, as these energies, & the powers of the agent con-
 jointly, both of which are variable. To apply
 these general observations to the influence of cold.
 a diminished temperature on the human sys-
 tem. we remark that, by these alone the great
 variety of changes produced can be reconciled
 or explained. A certain decrease of temperature,
 which invigorates some, to which many acknow-
 ledge an increase of spirit, health, & activity, de-
 presses others, & induces lassitude, rigor, dyspepsia,
 Rheum, catarrh. From greater changes arise
 rheumatism, pneumonia, the other phlegma-
 sia, & fever itself, according to the various pre-
 disposition of individuals. In all, the general



application of great or long continued cold produces Languor, Lassitude, Faintness, debility of the voluntary powers, drowsiness, torpor & death?

I believe then, that cold acts as a sedative primarily & directly, by suddenly abstracting a part of their stimulus, (heat) from the extreme ramifications of the capillary system, whereby not only these ramifications, but the whole capillary & arterial systems, & even the heart itself are weakened more or less, according to the greater or less intensity of the cold applied.

In that abate & elegant writer Quintus Curtius we find a memorable instance of the debilitating & dangerous effects of cold, suddenly applied to an overheated & exhausted frame. Alexander had performed forced marches, for many days, in order to anticipate the Persians in taking possession of the city of Sardus.



Exhausted by long continued toil & fatigue, & covered
with dust & sweat, the conqueror entering the city
at the head of his troops stripped himself in
sight of his army & plunged headlong into the
cold waters of the Cydnus, which ran through
the city. The immediate consequences are thus
finely described by his biographer - "*visque
inpropti subito horrore artus rigens caperunt.
pallor diuinde suffusus est, & totum propensum
dum corpus vitales calor reliquit. Aspiranti si-
militer ministerio manu exsiccant, nec satis
compotem morbis in tabernaculum deferunt.*"

Currie who believes in the direct stimu-
lant power of cold, quotes this passage in his re-
ports, & observes that he says no part of his con-
clusions upon it. It is, however, sufficiently well
authenticated, but the fact is, the effects of
cold described in the passage just quoted, are
wholly irreconcilable with Dr Currie's doctrine.
I



Alexander having lost much of the stimulus of heat, by the copious perspiration that flowed from him during his march, stood in need of a stimulant, at the same time he plunged into the Gdnus. A stimulus, (according to that gentleman) & a direct one too, was afforded him in the cold water; but the consequence of the cold was never before so near death. The consequence would have been still more dangerous, & perhaps fatal, had he taken a copious draught of the water into the stomach, not to this, had he swallowed some wine, brandy, or any other stimulant beverage.

The practice of drinking cold water, at a time when the system is much heated, & particularly when it is debilitated & exhausted by long continued action, toil, & fatigue, is sometimes fatal, & always dangerous. The symptoms of dangerous cases are thus described by Dr. Rush. A few



minutes after the person has swallowed the water. He is affected with a dimness of sight, he staggers in attempting to walk, & unless supported, falls to the ground, he breathes with difficulty, a rattling noise is heard in his throat, his nostrils & cheeks expand & contract in every act of respiration. His face appears suffused with blood, & of a livid colour, his extremities become cold, & his pulse imperceptible, & unless relief be speedily obtained, the disorder terminates fatally in four or five minutes".

"Then" says the Doctor, "but of one certain remedy for this disease, & that is liquid laudanum. The dose of it, as in other cases of spasm, should be proportioned to the violence of the disease. From a tea-spoonful to near a table-spoonful has been given, in some instances, before relief has been obtained. When the powers of life appear to have been suddenly suspended, the same



remedies should be used, which have been so successfully employed in rescuing persons supposed to be dead from drowning.

Cold has been found to be very beneficial in Typhus & other fevers; it has likewise afforded not a little relief, (if the reports of Currie be correct; in those two horrible & oppressing diseases, Tetanus & Epilepsy. The *modus operandi* of cold, in Fever, is very intelligible, & quite satisfactorily explicable, on the principles which I have been advocating. In Fever there is too great an excitation of caloric which being a stimulus directly & per se, the pulsations of the heart & arteries are increased in frequency, in proportion as the stimulus is increased. If cold water be applied to the surface, under such circumstances an absorption & refrigeration of caloric takes place, the action of the whole capillary system of the arterial system, & that of the

Below the word reaction, on the opposite page, in
the second line, immediate or speedy has been
accidentally omitted. It was intended to be, be-
yond the point of immediate or speedy reactions.

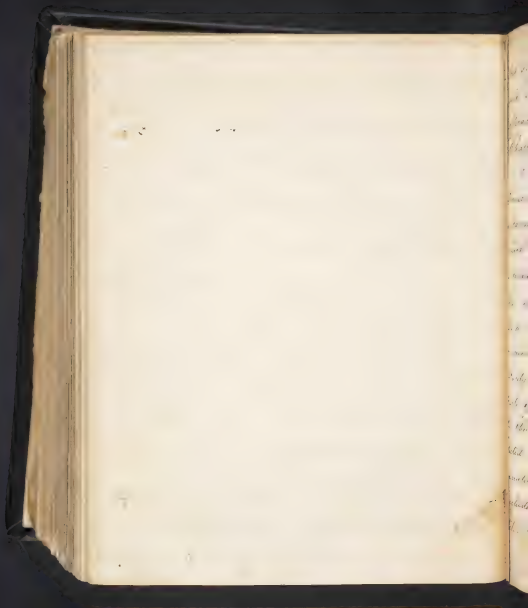
heart itself is diminished the pulse being kept up
 & continued beyond the point of reaction, the
 action of the heart & arteries becomes more na-
 tural i.e. diminished in frequency, but increased
 in force. & thus the excessive stimulus of the
 system being reduced by the counteracting & seda-
 tive influence of cold, the patient experiences very
 great relief. The patient is here relieved by cold,
 in a manner very similar to that, in which
 venesection proves so beneficial to a patient, whose
 system is overwhelmed & prostrated by excessive sti-
 mulation; & whose pulse is in that state, to
 which Dr. Rush gave the name of oppressed
 pulse.

Cold water may be applied in different
 ways, viz. by immersion, (which mode is per-
 formed by Currie in Epilepsy & Tetanus), by af-
 fusion, or dashing it on the body, by asper-
 sion or the Shower bath, & by Sponging. Currie



preferred application in Fever. Professor Chapman, who when a student of Medicine in Edinburgh witnessed the fatal effects of this mode of applying it, in many cases of Typhus in which there was but a partial or no reaction, prefers the last mentioned mode. "As a safe mode" says the professor, "I recommend sponging, & then the reaction should be slow, & the temperature about 98 or 100° of Fahrenheit. It removes heat, quiets restlessness, & all the results from old water may be had in this way".

Attention should be paid to the state of the system at the time of using it. "It may be safely used at any time of the day" says Dr. Christie "when there is no sense of chilliness present, when the heat of the surface is steadily above what is natural, & when there is no general or profuse sensible perspiration".
 These precautions (though never to be wholly



lost sight of) are not so necessary, when cold water is used in the safer & equally efficacious manner recommended by Dr. Chatumau.

The local effects of cold are divided by Thomson into three species. 1st Into those in which inflammation is excited, but an inflammation which, under proper management, has a tendency to terminate in spontaneous resolution. 2^d Into those in which the inflammation excited is followed by the state of evication, suppuration, or even ulceration. 3^d Into those, in which the vitality of greater or less portions of the extreme parts of the body is either immediately destroyed by their congelation, or the same destruction is effected afterwards, more slowly by gangrene, terminating in "sphacelus". These three species he includes under the general appellation of "frostbite". Professor Gibson, however, & most other writers



lers, I believe, on Geography treat the two first species as divisions under the name of Pernio, or Chilblain; & the last under the term Frost-bite. The mildest form of chilblain is attended with slight redness of the skin, a sensation of heat & itching, which symptoms spontaneously disappear in summer, but usually return in winter attacking the same parts.

This form of Pernio is not uncommon in temperate & moist climates. When the disease appears in its most violent shape, there is more or less swelling, the skin is red, but gradually regains a livid hue. The heat, itching, & pain are excessive, so much so that the patient is unable to use the part. Vesications sooner or later occur in some instances in a few hours, in others not for a day or two after the exposure. When the vesicles burst a serous fluid is evacuated, producing exoriations, which are soon converted in-



to ill conditioned sores, penetrating in many instances to the bone. These sores discharge a thin ichorous fluid, are very obstinate, & exceedingly difficult to heal.

Treatment. The milder chilblains may generally be cured by rubbing them with snow, or bathing them in ice water several times a day, keeping the part immersed each time, till the pain & swelling are much abated. This treatment is adapted neither to phlegmical, nor arthritical patients, nor is it suited to delicate females. In such cases, the affected parts may be rubbed with spirit of wine. *Linimentum saponis*. *tinctura myrrha*, or a strong solution of alum. or vinegar. & mixture of *oleum turbinthina* & *Balsamum copaiva* in equal parts, & another consisting of two parts of camphorated spirit of wine. & one of the *agua lithargyri acetati* are said



to violent operations. Victor says that
the application of electrical sparks to the part
affected soon restores its natural warmth. Rusted
cotton Balm and are praised by ²⁰⁰ Gibson
in this form of the complaint. The ulcerated cut
hair requires stimulating dressings, such as lint
dipped in a mixture of the aqua lithargyri
acetalis, & aqua calis. in tinctura nigricans, or
warm vinegar. Solutions of turpentine &c. of
the preparations of lead & lime water, mixed
with linseed oil, are often necessary & always
highly beneficial.

When the intensity of the cold is such
that the vitality of a part is suspended,
or destroyed, the injury is designated by the
term Frost Bite. The vitality of a part may be
lost either immediately or mediately im-
mediately by the cold, mediately by frost
formation. The condition of a part whose



vitality is suspended not destroyed according
 that of the hibernating animals in the winter
 season the stiff descent of feeling & completely be-
 lid. The indication then is in the first stage
 of all injuries resulting from exposure to cold,
 is to restore gradually the natural heat of
 the part. This is accomplished by rubbing the
 part affected with snow, or immersing it in
 ice water. No force is to be used in rubbing
 the part the gentlest friction only is to be
 employed. In this way the natural temperature
 may, if the surgeon be called in time, be restor-
 ed, & mortification prevented. When the parts have
 a tendency to mortify, stimulating embrocations
 become necessary, but if the inflammation is
 high, cold applications are required, as a solution
 of the acetate of Lead &c. Mortification having
 supervened, the usual remedies for it must be
 employed. But if instead of all this, the



patient be, in the first place, brought into a warm room, placed before a fire, & stimulating applications be employed, an action is excited in the parts too great for their power, & mortification is the inevitable consequence.

"When the system", says Dr. Gibson in his late work on Surgery, "is affected by cold to such an extent as to render the patient insensible, various means may be used to produce reaction. The chief indications are to excite the muscles of respiration, & to restore the circulation. The former may often be accomplished by sternutories & volatiles; & the latter by frictions with flannels, covered with stimulating materials, & applied to the whole surface, particularly to the epigastric region. This treatment should be continued, unremittingly, for a considerable time, for instances have occurred of recoveries, after the lapse of several days, & under the

[illegible]

most unfavourable circumstances. Some writers recommend the immersion of the whole body in ice water, but the practice cannot prove otherwise than injurious, & should never be pursued. After the patient has been somewhat revived, by the means pointed out, it will be proper to administer stimulants internally, such as brandy & water or a little warm wine. Very often it will become necessary to keep up for some time the patient's strength. In such cases the internal use of the sulphate of quinine, or of musk & ammonia combined, will prove exceedingly beneficial."

